APPENDIX 3C-1

November 2005
Consolidated Pre-Teleconference Comments

Peer Review of Three Air Indicators for EPA's 2006 Report on the Environment

October 31, 2005

Notice:

Pre-discussion comments were prepared by each consultant individually prior to the conference call. They are preliminary comments only, and are used to help consultants become familiar with the document and charge questions, develop the agenda, and identify key issues for discussion. During the discussion, consultants may expand on or change opinions expressed in their pre-discussion remarks and may introduce additional issues. For these reasons, pre-discussion comments should be regarded as preliminary and do not reflect the final conclusions and recommendations of individual consultants. These pre-discussion comments will be included as an appendix in the summary report, along with other background materials.

Table of Contents

Air Reviewer Biographies

Lyle Chinkin
Sonoma Technology, Inc.

Mr. Lyle Chinkin is a Senior Vice President for Sonoma Technology, Inc. (STI), where he manages the Emissions, Policy, and Geographic Information Systems (GIS) Services Division; he also serves as STI's corporate General Manager. He has over 25 years of professional air quality experience and began his career at the California Air Resources Board.

Mr. Chinkin is a nationally recognized expert in emission inventory preparation and assessment and air quality analysis. His clients include federal, state, and local government agencies; universities; public and private research consortiums; and major corporations. Mr. Chinkin's areas of expertise include (1) developing and improving regional emission inventories; (2) providing independent assessments of emission inventories using bottom-up and top-down evaluation techniques; (3) conducting field studies to obtain real-world data and improve activity estimates and emission factors; (4) conducting scoping study studies to develop conceptual models of community-scale air quality; (5) assisting with State Implementation Plan (SIP) development; and (6) providing expert testimony and presentations to public boards. He has been appointed to the National Research Council of the National Academy of Sciences Committee on the Effects of Changes in New Source Review Programs for Stationary Sources of Air Pollutants, and a panel to review "Improving Emission Inventories for Effective Air Quality Management Across North America, a NARSTO Assessment" (2005).

Mr. Chinkin served as (1) an EPA-invited peer-reviewer of the EPA particulate matter (PM) National Ambient Air Quality Standards Criteria Document; (2) an expert panel member for the review of the Valdez Air Health Study; and (3) an expert witness for the U.S. Department of Justice in its case involving heavy-duty diesel engine manufacturers. Mr. Chinkin was the project manager and co-author of the EPA national guidance document on the preparation of emission inputs for photochemical air quality simulation models. In addition, his research projects have included improving estimates of PM and ammonia emissions, evaluating internal-combustion-engine activity profiles and emissions, determining emissions from propane use and distribution systems, determining air toxic emissions from wood-preservation activities; and improving biogenic emission estimation tools. He frequently directs studies that involve public- and private-sector participation (e.g., an assessment and ground-truth study of industrial emissions in the Houston Ship Channel under the joint direction of the Texas Natural Resource Conservation Commission [now Texas Commission on Environmental Quality] and local industry).

Mr. Chinkin is frequently called upon by clients to help explain complicated technical information to other air quality professionals, advisory boards, and members of the public. He presented research findings to public advisory committees in Ohio, Kansas, and Missouri and senior federal and state government officials in Minnesota and at numerous scientific conferences. EPA selected Mr. Chinkin to help prepare a summary of the proceedings of the

2003 NARSTO air quality research conference, and to help an audience of air quality officials from four western U.S. states understand technical air toxics assessment techniques.

Kevin Civerolo
New York State Department of Environmental Conservation
Division of Air Resources

Kevin Civerolo has been a research scientist with the New York State Department of Environmental Conservation Division of Air Resources since 1998. Dr. Civerolo's primary task is to provide technical support for the state planning process for ozone, fine particulates, and mercury. His professional interests also include the evaluation of meteorological and photochemical models; estimating the effects of land use change and large-scale tree planting on air quality; analysis of spatial and temporal trends in air and water pollution data using traditional and non-traditional methods; and back trajectory and source attribution analysis. Dr. Civerolo also has experience in the development and use of several techniques for monitoring ambient reactive nitrogen compounds. He currently is an adjunct assistant professor at the University at Albany School of Public Health. His M.S. and Ph.D. degrees in Meteorology were awarded by the University of Maryland in 1993 and 1996, respectively.

George Hidy
Envair/Aerochem

Dr. George M. Hidy is an internationally known atmospheric scientist with over 40 years of experience in research relevant to air quality management and the environmental issues associated with energy production and use. Dr. Hidy is trained as a chemical engineer, and has served in a number of industrial and academic positions in which he has led investigations on Criteria Pollutant characterization, and airborne toxic chemicals.

Dr. Hidy has been an advisor to the Environmental Protection Agency, serving as a member of the Science Advisory Board Engineering Committee, and the Executive Committee. He also has been a reviewer of a number of EPA proposals and reports, particularly for the Office of Research and Development. He has served on a number of National Research Council committees on environmental chemistry and energy related technologies. Dr. Hidy's current interests include airborne particles, both in terms of the National Ambient Air Quality standards, and in terms of visibility impairment. He also has been active in NARSTO in preparation of its ozone and particulate matter state-of-science assessments, as well as its emission inventory assessment. With his colleagues, Dr. Hidy recent completed a major review integrating atmospheric chemistry with the toxicology and epidemiology of particulate matter. He is also involved in extending knowledge of secondary particle formation, especially airborne nitrate and carbon, in relation to their origins and ambient concentration reductions.

This page intentionally left blank

Comments for Air Indicators

This page intentionally left blank

Attachment 2: Indicator Comment Sheet

Please fill out a separate sheet for each indicator. When suggesting specific changes to the indicator, please indicate which changes are "critical" (i.e., the indicator should not be included unless the change is made).

Topic Area: **Air**
Indicator Name: **Ambient Nitrogen Dioxide Concentrations**

1) Please indicate the extent to which you think *the* proposed indicator is appropriate, adequate, and useful (AA&U) for evaluating our nation's air and therefore useful for contributing to an overall picture of our nation's air.

1	2	3	4
Indicator is not AA&U	Indicator is of somewhat AA&U	Indicator is largely AA&U	Indicator is completely AA&U

Chinkin: (4) NO_2 ambient concentrations are declining and represent a success story of control efforts.

Civerolo: (3) Nitrogen dioxide is a criteria pollutant, and it plays a crucial role in ozone/particulate formation, acid deposition, surface water eutrophication/acidification, and other environmental problems. Inclusion of this indicator is consistent with other indicators (for CO, Pb, and other indicators both the emissions and ambient concentrations were included in the original draft ROE).

Hidy: (4) This metric was recommended by reviewers of the ROE material earlier this year. The narrative and graphs largely satisfy the reviewers' request, and complete the picture of Criteria Pollutants trends. Data are shown back to 1980, which gives a good perspective on annual NO2 trends.

The narrative may be somewhat limited in discussion of interferences like PAN, which will add an error or bias to the results. Without direct knowledge of trends in PAN or HNO3 this error cannot be estimated for the early years.

Fig. 1 needs to have the median shown instead of the average, as reviewed for all such graphs previous.

The second figure shown trends by region needs to have stronger color contrasts to make any sense by region out of the each of the trend lines.

2) Please indicate the extent to which you think the proposed indicator makes an important contribution to answering the specific ROE question it is intended to answer (see Attachment 1 for list of questions). (Note: An indicator may be judged less important if it makes a smaller or less critical contribution to answering the question posed than the other indicators, or if it covers an area of less or diminishing importance environmentally.)

1	2	3	4
Indicator is not important	Indicator is of minor importance	Indicator is important	Indicator is critical

Chinkin: (3) NO2 has proven health impacts and its decline is important to report.

Civerolo: (3) Urban concentrations of NO2 have steadily declined over the past few decades, so that this indicator is not as important from a NAAQS standpoint as it once was, perhaps. However, it will be useful to continue monitoring ambient NO2 levels to track progress resulting from proposed emissions reductions (e.g NOx SIP call, acid rain legislation).

Hidy: (4) The annual trends in NO2 are an important indicator of progress in reducing a major emissions from combustion sources. There are health concerns about exposure to NO2 directly, and indirectly through its role in O3 production. NO2 is oxidized in the atmosphere to produce PAN, a potentially toxic and product, and HNO3 a factor in acidification of ecosystems. NO2 is a Criteria Pollutant, which has been of concern for sometime.

The main ameliorating feature about NO2 is the fact that measurements of annual averages have long indicated that it basically is in compliance everywhere in the U.S.. Thus concerns may be for exposure to short term extremes or for extremes near large NOx sources, including major highways. These latter considerations are probably beyond the scope of discussion in the 06ROE.

The trend discussion would be more impressive if it were linked with trends in NOx emissions.

3) To what extent do you think the indicator meets the following <u>indicator definition</u>:

> *An "indicator" is **a numerical value derived from actual measurements of a pressure, ambient condition, exposure, or human health or ecological condition** over a specified geographic domain, whose trends over time represent or draw attention to underlying trends in the condition of the environment.*

1	2	3	4
Doesn't meet the definition	Only partly meets the definition	Largely meets the definition	Fully meets the definition

Chinkin: (4)

Civerolo: (4) Observed trends in urban NO2 concentrations appear to be generally consistent across the country. One may or may not use the term "success story" (as was done in the

original indicator review for CO and Pb), but the improvements in NO2 concentrations are still fairly substantial.

Hidy: (3) See above notes. The discussion provided about the historical limitations in the NO2 measurements based on chemiluminescence is too limited. I believe the current thinking is that the NO measurements reported are good, but the NO2 measurements are suspect, especially for low concentrations of NO2. The degree to which this affects the annual averages used, and the trends is unknown?

4) To what extent do you think the indicator meets each of the following indicator criteria:

a) The indicator makes an important contribution to answering a question for the ROE. (In this context, "important" means that the indicator answers a substantial portion of and/or a critical part of the question.)

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (3)
Civerolo: (3)
Hidy: (4)

b) The indicator is objective. It is developed and presented in an accurate, clear, complete, and unbiased manner.

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (2)
Civerolo: (3)
Hidy: (2)

c) The underlying data are characterized by sound collection methodologies, data management systems that protect its integrity, and quality assurance procedures.

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (4)
Civerolo: (2)
Hidy: (2)

d) Data are available to describe changes or trends, and the latest available data are timely.

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (4)
Civerolo: (3)
Hidy: (4)

e) The data are comparable across time and space, and representative[1] of the target population. Trends depicted in this indicator accurately represent the underlying trends in the target population.

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (4)
Civerolo: (3)
Hidy: (2)

f) The indicator is transparent and reproducible. The specific data used and the specific assumptions, analytic methods, and statistical procedures employed are clearly stated.

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (3)
Civerolo: (4)
Hidy: (3)

Please explain:

Chinkin: Overall, the indicator is good, but I think it should be emphasized that the indicator is conservative of the actual rate of change because of the extrapolation of missing endpoints.

Also note that T4Q1 refers to 9 years while T1Q3 and the plots show 24 years of data.

Civerolo: As is stated in the limitations section, the reference method for NO2 is not specific to NO2. In areas with high NOx levels, interferences will not be overly significant. However, if there were any suburban or rural monitors included in this report, those data might very well suffer from interferences. Instruments that employ a UV photolytic converter (high sensitivity to

[1] An indicator seeks to describe trends in an overall target "population" (e.g., land area, type of surface water, type of emissions, U.S. population), yet data often can only be sampled from a subset of this population. The validity of the trends described by the indicator will depend on the degree to which the sampled population is representative of the target population.

NO2, much lower sensitivity to interferents like PAN) are certainly more specific than instruments that use a heated surface/catalyst upstream of the chemiluminescence detector. Given these caveats, I would still rank this indicator as "largely" worthy of inclusion in the ROE.

Hidy: The indicator is objective, and based on a long record of historical ambient measurements, with the limitations noted above. The effects have been studied for many years. The health effects are beginning to be detected, especially at extreme exposure limits near ground level combustion sources. The link with O3 production is well known, and the concerns for PAN effects on humans and vegetation have long been known as has the acid deposition issue.

The underlying data have important limitations historically that don't seem to come out in the narrative. The link with the trends and trends in NOx emissions should be discussed. The discussion could be a bit more transparent, and reproducibility could be discussed with reference to sources of measurement error.

5) Do you have any suggestions for more effective graphic presentation of the data? If yes, please describe.

Chinkin: I prefer showing the median as the central tendency rather than the average (which is more subject to extreme values).

Civerolo: In the earlier draft of the ROE, for some of the indicators, a map was included when trends where displayed by EPA region. If this is still the case, it might be worth superimposing the regional trend lines shown in Figure 355-2 on a map that is color-coded by region for consistency. Also regarding Figure 335-2, the colors are somewhat difficult to distinguish; please consider other color schemes. Neither of these suggestions would be considered critical for inclusion in the report.

Hidy: The graph in Fig. 1 needs to show the median change to be consistent with earlier recommendations.

Graph 2 is very difficult to read because the colors of trends per region are too similar— This needs to be fixed.

6) Please provide any additional comments, suggestions, or concerns regarding the indicator that you have not already noted in Questions 1 through 5. In particular, note any limitations to the indicator that you have not already described in your responses to the preceding questions.

Chinkin: [no comment provided]

Civerolo: The first paragraph describes NOx as consisting of NO, NO2, and other oxidized nitrogen species. I have always thought of NOx as being identically NO + NO2. Perhaps they are referring to total reactive nitrogen (NOy = NO + NO2 + PAN + HNO3 + …). Please clarify this.

In the third paragraph under "What the data show," the text states that both figures show the 10^{th} and 90^{th} percentiles. In fact, only Figure 335-1 shows the central 80% range. The text needs to be modified here to reflect this.

I think that the first of my two suggestions is fairly minor, the second one more important (and perhaps simple oversight).

Hidy: [no comment provided]

7) Overall, this indicator:

Chinkin: Should be included in ROE06 TD.

Civerolo: Should be included in ROE06 TD.

Hidy: Should be included in ROE06 TD only if the modifications identified above as critical are made.

Attachment 2: Indicator Comment Sheet

Please fill out a separate sheet for each indicator. When suggesting specific changes to the indicator, please indicate which changes are "critical" (i.e., the indicator should not be included unless the change is made).

Topic Area: **Air**
Indicator Name: **Ambient Concentrations of Manganese Compounds in EPA Region 5**

1) Please indicate the extent to which you think the proposed indicator is appropriate, adequate, and useful (AA&U) for evaluating our nation's air and therefore useful for contributing to an overall picture of our nation's air.

1	2	3	4
Indicator is not AA&U	Indicator is of somewhat AA&U	Indicator is largely AA&U	Indicator is completely AA&U

Chinkin: (2) As a demonstration of monitoring trends of a pollutant of regional or local concern I think the indicator is useful.

Civerolo: (3) Based upon the revised text and the EPA responses, and considering EPA's desire to include a couple of indicators of regional interest, it appears that the health risks associated with exposure to Mn are important, and that this indicator may be worthy of inclusion in the ROE.

Hidy: (2) This is narrowly oriented regional index that has to be placed the context of a national picture. While this Region 5 Mn index is better than the previous one it still relies on TSP which is a poor measure of inhalation exposure, as currently used for PM2.5 and PM10. The TSP metric includes very larger particles > 10 micrometers diameter, while inhalation exposure now relies on PM10 or PM2.5. Since there is a large amount of Mn data now for PM2.5 and some for PM10 it's unclear why there continued reliance on TSP as the means of sampling.

At the very least, this metric has to be tied to some kind of national context, even if old TSP Mn data are used as a baseline to give the reader some understanding of the conditions in the US relative to the Great Lakes Region. There are PM10 and PM2.5 data available for Mn from both the EPA Speciation and the IMPROVE networks, which could be used for a coarse comparison with the TSP data to establish its credibility in terms of other metrics adopted more generally in the US.

2) Please indicate the extent to which you think the proposed indicator makes an important contribution to answering the specific ROE question it is intended to answer (see Attachment 1 for list of questions). (Note: An indicator may be judged less important if it makes a smaller or less critical contribution to answering the question posed than the other indicators, or if it covers an area of less or diminishing importance environmentally.)

1	2	3	4
Indicator is not important	Indicator is of minor importance	Indicator is important	Indicator is critical

Chinkin: (3) Sites are measuring levels of concern.

Civerolo: (3) The data reflect current ambient conditions over a specific region of the country. It does not appear that there is any diminishing importance of this indicator.

Hidy: (3) The indicator is potentially important for local areas like those of concern in Region 5. However, it is unclear what the TSP measure means in terms of an inhalation RfC,. What is most important fine particles, coarse particles or very large particles or all three inhalation measures?

3) To what extent do you think the indicator meets the following indicator definition:

> *An "indicator" is* ***a numerical value derived from actual measurements of a pressure, ambient condition, exposure, or human health or ecological condition*** *over a specified geographic domain, whose trends over time represent or draw attention to underlying trends in the condition of the environment.*

1	2	3	4
Doesn't meet the definition	Only partly meets the definition	Largely meets the definition	Fully meets the definition

Chinkin: (3)

Civerolo: (2) The time period of five years is not really long enough to estimate trends. The text does not discuss possible reasons for the stated decline (14.7%).

Hidy: (2) The metric involves a sampling for a broad range of particle size for Mn composition which is not consistent with current PM measures for human inhalation exposure. The reason for this needs to be explained carefully in the narrative. The results from Region 5 survey using TSP are not put in a national context to understand the high levels vs. rural or residential conditions across the country.

The discussion about Mn in other EPA documents is ambivalent, for example, about the use of Mn in automobile fuels, and evidently Mn is an important metal for human health at ingested, low levels. It would be desirable to explain these apparent inconsistencies with the establishment of the RfC concept.

4) To what extent do you think the indicator meets each of the following indicator criteria:

a) The indicator makes an important contribution to answering a question for the ROE. (In this context, "important" means that the indicator answers a substantial portion of and/or a critical part of the question.)

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (3)
Civerolo: (2)
Hidy: (2)

b) The indicator is objective. It is developed and presented in an accurate, clear, complete, and unbiased manner.

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (3)
Civerolo: (3)
Hidy: (2)

c) The underlying data are characterized by sound collection methodologies, data management systems that protect its integrity, and quality assurance procedures.

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (3)
Civerolo: (3)
Hidy: (2)

d) Data are available to describe changes or trends, and the latest available data are timely.

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (3)
Civerolo: (3)
Hidy: (3)

e) The data are comparable across time and space, and representative[2] of the target population. Trends depicted in this indicator accurately represent the underlying trends in the target population.

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (3)
Civerolo: (2)
Hidy: (2)

f) The indicator is transparent and reproducible. The specific data used and the specific assumptions, analytic methods, and statistical procedures employed are clearly stated.

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (3)
Civerolo: (3)
Hidy: (3)

Please explain:

Chinkin: [no comment provided]

Civerolo: Please see my previous comments.

Hidy: This metric has potential significance to highly localized populations in a commercial or industrial environment. The results reported for Region 5 are complicated by transport over the Canadian border from the Canadian use of MMT and gasoline. It's unclear if there is a problem with Mn anywhere but Region 5 in the localized areas.

As noted above the use of TSP as a means of sampling is not consistent with current Pm sampling practice, which is stated to be most relevant to inhalation exposure. The data provide some indication of trends from 2000-2004, but they could be extended for many years historically if TSP Mn were used from data as far back as the 1960s.

The data are not comparable with other reported metals data measured in terms of PM10 and PM2.5. The indicator is presumably transparent and reproducible if one accepts the relevance of TSP sampling.

[2] An indicator seeks to describe trends in an overall target "population" (e.g., land area, type of surface water, type of emissions, U.S. population), yet data often can only be sampled from a subset of this population. The validity of the trends described by the indicator will depend on the degree to which the sampled population is representative of the target population.

5) Do you have any suggestions for more effective graphic presentation of the data? If yes, please describe.

Chinkin: I prefer the plot Fig 200R.2 Trend to look like the other ambient trend plots (using area plots rather than line plots).

Civerolo: Showing the Mn concentrations by land use in Figure 200R-1 is interesting. An additional way to display the data would be to display median concentrations as a function of distance from urban centers in Canada (assuming that MMT is an important source of ambient Mn).

In both Figures 200R-1 and 200R-2, the 10th percentiles are shown in yellow. Please consider another easier-to-read color.

Hidy: A national map of Mn from the Speciation network data and from the IMPROVE data would help to put these Region 5 results into context. If TSP is used, EPA should go back into the historical records for Mn data as far back as the 1960s to understand the long terms trends, and graph them for the reader.

6) Please provide any additional comments, suggestions, or concerns regarding the indicator that you have not already noted in Questions 1 through 5. In particular, note any limitations to the indicator that you have not already described in your responses to the preceding questions.

Chinkin: [no comment provided]

Civerolo: I am concerned about presenting five years of data as a trend. I think the data presented here are more useful for characterizing the current ambient levels.

It is also unclear to me how there can be a 14.7% decrease in ambient Mn concentrations but no apparent trend in Region 5 emissions according to the TRI (since "hotspots" will likely affect the distribution of the data). If EPA has any information on MMT use in Canada over this period, it might be worth including here. Was the large decrease in the 90th percentile from 2002-2003 due to reductions in Canada, or reductions in an upwind EPA region, or something else?

I feel that these critical concerns need to be addressed if this indicator is to be included in the ROE.

Hidy: [no comment provided]

7) Overall, this indicator:

Chinkin: Should be included in ROE06 TD.

Civerolo: Should be included in ROE06 TD only if the modifications identified above as critical are made.

Hidy: Should be included in ROE06 TD only if the modifications identified above as critical are made.

Attachment 2: Indicator Comment Sheet

Please fill out a separate sheet for each indicator. When suggesting specific changes to the indicator, please indicate which changes are "critical" (i.e., the indicator should not be included unless the change is made).

Topic Area: **Air**
Indicator Name: **Ozone and PM Concentrations for U.S. Counties in the U.S./Mexico Border**

1) Please indicate the extent to which you think the proposed indicator is appropriate, adequate, and useful (AA&U) for evaluating our nation's air and therefore useful for contributing to an overall picture of our nation's air.

1	2	3	4
Indicator is not AA&U	Indicator is of somewhat AA&U	Indicator is largely AA&U	Indicator is completely AA&U

Chinkin: (2) As an indicator of potential influence of international transport it is useful.

Civerolo: (3) The revised text and EPA responses better reflect the justification for including this indicator. It is unfortunate, however, that pollutant concentration data from the Mexican side of the border cannot be included in this report.

Hidy: (2) This indicator is an expanded one over the initial indicator that focused only on O3, I believe. The data taken from 86-04 provide a limited long term record of conditions along the southern border between the U. S. and Mexico. The indicator in its present form has lost some information. The number and location of the county sites used in the analysis is not discussed. Further the graphs are confusing in giving lines for "all border sites" over the same period as the few border sites designated as covering the entire period. This does not make sense. The use of the specialized term, design value for O3 and PMx makes no sense to a lay-reader at all—At the very least this terms needs to be explained in the narrative. And if these are design values in the graphs why aren't they "constant" tied to the latest year of interest—Why trends in design values? Aren't design values used only for modeling?

The reason for the large PM10 concentrations observed along the border relative to the national average need an explanation—maybe as simple as the border is arid and very dusty. An explanation also is warranted concerning the secondary maximum occurring in PM10 Region 9 data concentrations post 96-97.

There is no discussion of the (international) populations exposed to these O3 and PMx levels—presumably there are no other effects of concern in this desert region other than human health?

There is no discussion of the broader motivation for concentration on the Southern border—growth and expansion or commitments made from NAFTA or concern for SIP development in the southern tier of western dates??

2) Please indicate the extent to which you think the proposed indicator makes an important contribution to answering the specific ROE question it is intended to answer (see Attachment 1 for list of questions). (Note: An indicator may be judged less important if it makes a smaller or less critical contribution to answering the question posed than the other indicators, or if it covers an area of less or diminishing importance environmentally.)

1	2	3	4
Indicator is not important	Indicator is of minor importance	Indicator is important	Indicator is critical

Chinkin: (3) Ozone and PM have proven health effects.

Civerolo: (3) As the border region continues to grow industrially and population-wise, it will become increasingly important to monitor ozone and PM levels in this unique region. This indicator will be more important in future ROE's.

Hidy: (3) This approach to characterizing air quality along the US-Mexico border in terms of O3 and PMx is an improvement over the first draft indicator. However, as noted above there a number of questions about the details that need to be answered or explained for the reader to understand the indicator.

3) To what extent do you think the indicator meets the following <u>indicator definition</u>:

> *An "indicator" is* ***a numerical value derived from actual measurements of a pressure, ambient condition, exposure, or human health or ecological condition*** *over a specified geographic domain, whose trends over time represent or draw attention to underlying trends in the condition of the environment*.

1	2	3	4
Doesn't meet the definition	Only partly meets the definition	Largely meets the definition	Fully meets the definition

Chinkin: (2) Limited number and locations of monitoring sites make spatial determinations suspect.

Civerolo: (3) There are adequate O3 and PM10 data to estimate trends in this region, but not for PM2.5. The IMPROVE database could provide a longer PM2.5/PM10 record in this region, albeit at rural locations.

Hidy: (2) The narrative is vague about the number of sites involved in the sample, the time periods used for some sites, and the location of sites used in the analysis. This information is a must for readers who want to look into the details of the indicator results.

4) To what extent do you think the indicator meets each of the following indicator criteria:

a) The indicator makes an important contribution to answering a question for the ROE. (In this context, "important" means that the indicator answers a substantial portion of and/or a critical part of the question.)

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (3)
Civerolo: (3)
Hidy: (2)

b) The indicator is objective. It is developed and presented in an accurate, clear, complete, and unbiased manner.

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (2)
Civerolo: (2)
Hidy: (2)

c) The underlying data are characterized by sound collection methodologies, data management systems that protect its integrity, and quality assurance procedures.

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (3)
Civerolo: (3)
Hidy: (2)

d) Data are available to describe changes or trends, and the latest available data are timely.

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (3)
Civerolo: (3)
Hidy: (2)

e) The data are comparable across time and space, and representative[3] of the target population. Trends depicted in this indicator accurately represent the underlying trends in the target population.

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (2)
Civerolo: (2)
Hidy: (2)

f) The indicator is transparent and reproducible. The specific data used and the specific assumptions, analytic methods, and statistical procedures employed are clearly stated.

1	2	3	4
Doesn't meet this criterion at all	Only partly meets this criterion	Largely meets this criterion	Fully meets this criterion

Chinkin: (3)
Civerolo: (3)
Hidy: (1)

Please explain:

Chinkin: Lack of data from across the border make spatial determinations suspect.

Civerolo: Each of the plots includes trends based upon all sites in the region, as well as trends based on only those sites operating during the entire time period. Sometimes they are generally consistent (see, for example, Figure 296R-1b, Region 9 PM10 design values), and sometimes not (see Figure 296R-2c, Region 6 PM2.5 design values). The trends based on those few long-running sites may not represent the region as a whole.

Hidy: From a NAFTA commitment, this baseline measure is probably important for readers to be aware of. However, the measures cited rely on a very limited number of sites along the border, operating over different time periods. Its questionable whether they are representative of conditions which are expected to change substantially in the coming years. The indicator in this sense is not especially objective since its biased by the sites available. The data available are from conventional NAMS and SLAMS monitoring, and are considered reliable. They are not extendable to the entire distance along the border, are probably not representative of conditions in Mexico. Incidentally there are urban data in Mexico at least for short term campaigns that might be useful for comparison. In their current form the data are neither transparent or

[3] An indicator seeks to describe trends in an overall target "population" (e.g., land area, type of surface water, type of emissions, U.S. population), yet data often can only be sampled from a subset of this population. The validity of the trends described by the indicator will depend on the degree to which the sampled population is representative of the target population.

necessarily reproducible unless more is stated about which stations are used, and which have operated during the entire period vs. shorter periods.

The trends are of interest in principle, but need to be explained better in terms of a U.S. national context, or perhaps comparison with urban and IMPROVE (PMx) data in the Southwest.

5) Do you have any suggestions for more effective graphic presentation of the data? If yes, please describe.

Chinkin: [no comment provided]

Civerolo: It might help to include a map of the border region, indicating Regions 6 and 9 and the locations of the O3/PM monitors in these regions.

In each of the plots, there is a national trend line, an "all border sites" trend line, and a trend line that follows those few monitors that covered the entire time period. I would consider removing the latter curve (and corresponding discussion in the text), since it reflects as few as two sites. The other trend lines include more sites and can better characterize the appropriate regions.

These are not critical suggestions, but ones that could easily be done.

Hidy: The graphs should be given in terms of annual averages or some form relevant to the O3 standard—The design value term does not mean anything to the uninformed reader.
If one is going to expand the pollutant measures for the border are there useful long terms data for CO, NO2 and SO2 as well?

6) Please provide any additional comments, suggestions, or concerns regarding the indicator that you have not already noted in Questions 1 through 5. In particular, note any limitations to the indicator that you have not already described in your responses to the preceding questions.

Chinkin: I don't feel strongly that the indicator should be included, but I will not object to it being included.

Civerolo: The indicator is labeled "280R" but the figures are labeled "296R."

The introductory section could be shortened, perhaps by removing the second and third paragraphs. The general information on O3 and PM will presumably appear in the respective chapters; only the information specific to the border region really needs to be included here.

I would suggest that some additional text be added that says clearly that future ROE's will include concentration data from Mexico to more completely characterize the region as a whole.

These are not critical suggestions, but ones that could easily be done.

Hidy: While the informed reader or "expert" can readily understand the interest in air quality along the southern border from both the U.S. and the Mexican standpoint, this indicator narratie and graphs don't really provide average reader perspective on the international issues at hand. Additional effort needs to be put into the narrative and some more creative thinking about how to

represent baseline conditions in terms of measurement along the border, which are very sparse for the 2000 mile length of the border.

Since this indicator is a stretch for credibility in terms of actual measurement quality and spatial-temporal; coverage, its questionable that it should be include in the ROE06.

7) Overall, this indicator:

Chinkin: Should be included in ROE06 TD.

Civerolo: Should be included in ROE06 TD.

Hidy: Should be included in ROE06 TD only if the modifications identified above as critical are made.